GIBBES (H) + SHURLY (E. L.)

ON THE VALUE

OF

THE INHALATION OF CHLORINE GAS

AND THE USE OF

IODINE AND CHLORIDE OF GOLD AND SODIUM HYPODERMICALLY

IN THE

Treatment of Pulmonary Consumption.

WITH AN ABSTRACT OF THE CLINICAL HISTORY OF TWENTY-SEVEN CASES.

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HENEAGE GIBBES, M.D.,

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Respectfully yours, E. L. Shurly

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ON THE VALUE OF THE INHALATION OF CHLORINE GAS AND THE USE OF IODINE AND CHLORIDE OF GOLD AND SODIUM HYPODERMICALLY IN THE TREATMENT OF PULMONARY CONSUMPTION,

WITH AN ABSTRACT OF THE CLINICAL HISTORY OF TWENTY-SEVEN CASES.

IN answer to many requests, suggestions, and inquiries, we herewith publish notes of further observation upon the treatment of phthisis pulmonalis with iodine and gold and sodium chloride hypodermically and chlorine gas locally, together with some case histories illustrating the same. While our experience is yet too limited to determine accurately its real value compared to other plans of treatment, still its use, more or less, for about eight months on human beings has given us some data which may prove interesting.

First, have we a theory? Yes. We have a theory founded on facts that general tuberculosis and phthisis pulmonalis, as diseases, are entities differing considerably,—the one a general disease in which the anatomical lesions may be found in all the organs of the body; the other, with anatomical lesions principally and primarily in the respiratory apparatus;

the final course of the former (tuberculosis) depending upon a destructive taking the place of the constructive metabolism, and concerning the bichemical actions belonging to either protoplasm, nuclein, or chloromin, or all combined, and depending upon either hereditary or acquired tendency to elemental perversions of nutrition: these resulting in the formation of chemical poisons known as toxalbumoses.

To the query as to what is meant by inherited tendency may be mentioned syphilis and acquired exhaustion from mental overwork, worry, pernicious habits of life, bad surroundings, etc. Regarding the bacillus tuberculosis as a factor, we do not deny its universal existence in nature and the possibility of its spores entering the interfascicular lymphatic spaces through the pseudo-stomata in the air-cells, thence into the lymph-current to the bronchial glands, but believe that these spores, having thus passed into the tissues, cannot germinate unless they find a suitable pabulum, which in the case of the tubercle bacilli we believe to be caseous matter; and we consider this to be proved by the fact that in inoculated animals we do not find tubercle bacilli in the lesions until caseation has taken place; it would, therefore, seem that some substance associated with them constitutes the real virus.

Phthisis pulmonalis we believe to be a disease located in the pulmonary organs, and in each instance an inflammatory process of greater or lesser degree or extent resulting in permanent or destructive changes of the tissues, which are likewise accompanied by the production of deleterious chemical substances which set up constitutional disturbances and exhaust

the vital forces. The particular form of degeneration known as caseation is probably peculiar to the lungs, lymphatic tissues, etc., although in the present state of our knowledge it cannot be differentiated from apparently similar processes in other organs. Hence, with such ideas, we have been working for the last few years to find something which would combine with and neutralize these tox-albumoses, or whatever they may be, and arrest the disease process. To this end we have labored, with the result that we find that chlorine gas, iodine, ammonium iodide, potassium iodide, the double salt of chloride of gold and sodium, liquor potassæ, potassium permanganate, iron arseniate, the mercurial salts, etc., will do good service. Chlorine gas, iodine, and the double salt of gold and sodium chloride, however, are by far the most efficacious. In the first place, these substances must be chemically pure, and the solution must contain glycerin. We have been trying solutions made with ether, lanolin, oleic acid, fixed oils, etc., especially with iodine, but whether we can obtain such good results as with the glycerin is a question yet to be determined.*

CHLORINE GAS.

There are two modes of administering chlorine. First, the gas may be evolved from chlorinated lime (which is nearly one-half chlorine) by the addition of dilute hydrochloric acid. In

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* Dr. Clark has been indefatigable in this work, having made solutions with almost every solvent known to chemists, the interesting results of his labor in this line will be published soon.

a small room or compartment of about five hundred and fifty cubic feet place from one-half drachm to six drachms of chlorinated lime spread out in a saucer or shallow glass dish, and to this add slowly from one to three drachms of dilute hydrochloric acid, stirring with a wooden spoon or spatula. There are few cases requiring as much as the six drachms. One-half drachm is the commencing amount, and more should be used each day until about three to four drachms is reached. Before the gas is evolved the atmosphere should be well charged with a spray of a saturated solution of sodium chloride. It will take about two ounces of the solution to do this, but more will be required if the room is not comparatively air-tight. The spray should be continued during the evolution of the gas; in fact, during most of the time the patient is there. The patient should be directed to keep the mouth closed and breathe through the nose. It seems in a majority of cases that mouth-breathing during the inhalation leads to coughing. The first sitting may be about two minutes, while the subsequent ones may be increased to twenty or thirty minutes. One or at most two sittings are sufficient, although some cases will require three or four daily.

The other method for inhalation of chlorine, and one which is preferable for mild cases and for laryngeal phthisis, is the inhalation of chlorine water. The chlorine water should be made according to the U. S. Pharmacopœia, and may be mixed with a saturated solution of salt in the proportion of one-half, one-third, or one-fourth, and from one-half to two ounces of the mixed solution may be vaporized at a sitting. Should

much irritation follow an inhalation for any considerable time, less must be used.

Cases of laryngeal phthisis where there is not much "breaking down" ought to be treated with the weaker solution, while those showing considerable ulceration will need frequent sittings and stronger solutions. A face inhaler, such as is used in Harper Hospital,* offers the best mode of administration.

Chlorine inhalations seem to be very efficient in preventing further caseation, as shown by changes in the sputum and the alteration of some of the physical signs under its use. A varying tolerance to it will be observed from time to time, probably owing to the quantity of secretion present in the bronchial tubes at time of inhalation. Usually it is better for the patient to inhale soon after a thorough expectoration and not too near meal-times, as not unfrequently there is a striking effect upon the stomach, as shown by nausea or vomiting, which may be brought about through the nerve-centres. The gas is practically irrespirable unless diffused in vapor of chloride of sodium. This was probably the reason for its abandonment by Gannel, who gave it by inhalation in 1828.

Hypodermic Injections.—On account of the changes which chemicals undergo in the stomach and intestines before diffusion throughout the system, it is almost impossible to obtain certain effects, especially upon those morbid products known as toxalbumoses. It is, therefore, necessary to avail ourselves of some other

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* The Harper Hospital Inhaler can be procured of Milburn, Woodward Avenue, Detroit.

way for introducing medicaments into the body, and perhaps there is no better way than by the hypodermic method. The instrument should be provided with either gold- or platinum-plated needles. Any hypodermic syringe which can be kept clean and aseptic will answer the purpose. Owing to the action of both iodine and gold on the packing and needle, it is difficult to keep the instrument in order without great attention. Immediately after its use it should be cleansed with warm water, and then with alcohol, after which it should be charged with a five per cent. solution of carbolic acid, which may remain in the barrel for at least ten minutes. Just before using again, it should be cleansed with warm water. Whenever the needle becomes rough or dull, it should be thrown away. Regarding the place for insertion, we have found the gluteal region preferable, because there is less pain, danger of abscess, or ulceration of the skin. Probably other regions may offer as favorable a site in some individuals. The iodine solution gives considerable pain to some people, to others very little, but the gold solution gives little or none. We hope that a solution can be made with lanolin, or something of that sort, which will obviate this objection in the case of iodine. With a majority of patients we find it better to begin with the iodine $\frac{1}{12}$ grain daily, gradually increasing until reaching $\frac{1}{2}$ grain, and in some instances 1 grain; then the gold and sodium solution may be injected daily, beginning with $\frac{1}{80}$ or $\frac{1}{20}$ grain, and gradually increasing until reaching $\frac{1}{3}$, or even $\frac{1}{2}$ grain at this point, the quantity should be diminished to $\frac{1}{10}$ grain daily if the medication

is to be continued. At this stage it will be found often better to alternate them, one day using iodine and the next gold. If albumen appears in the urine, the iodine must be suspended, and the gold alone used. The continuance of large doses of the gold and sodium salt may produce a golden color of the skin, which can possibly be attributed to bile. During the administration of iodine in this way, the patient usually loses weight, and if, having had previously a tendency to catarrh of the bladder or intestines, this condition may be again set up.

The temperature also usually increases for a week or ten days, and may be accompanied by excessive sweating. The expectoration soon becomes lessened, and watery later on. Asthmatic symptoms and anorexia may in some instances supervene, the tongue becoming heavily coated, and, when the point of saturation is reached, diarrhœa comes on, the throat is dry, and the patient listless. The pulse may be quickened, but does not seem to loosen its tension. These symptoms occur only in a small percentage of the cases. The injection of gold and sodium in these cases is followed by a tonic reaction, these symptoms gradually disappearing, excepting perhaps the anorexia. In large doses of the gold and sodium, vertigo and nausea may appear occasionally. Our experience would show that the majority of patients do better on smaller than on large doses. One feature which seems to be quite constant in cases showing rapid improvement is the supervention of asthmatic symptoms, such as sibilant râles, which may be due to the astringent action of the gold. There has been little or no ten-

dency to hæmoptysis, although blood streaked mucus is sometimes observed under large doses of iodine. In three cases enlarged lymphatic glands rapidly disappeared. After two or three weeks, as a rule, these chemicals ought to be used alternately every day or every other day; finally once or twice a week. Iodine cannot be used alone for any great length of time, but the gold and sodium salt can; therefore, by using them alternately, the effect of the iodine may be prolonged.

The following cases have been taken at random from the clinical records of Harper Hospital:

Case I.—Wm. C., aged 22; native of Detroit; single; occupation, clerk in railroad office; good habits.

Family History.—A number of father's family have suffered with phthisis. One older brother of patient has phthisis. Has generally been well until January, 1890, when he "took cold," and has coughed since with increasing expectoration and has been losing weight; has had no hæmoptysis, but has expectorated bloody mucus; chills and fever irregular; some night-sweating; no diarrhœa, but indigestion; not hoarse; no sore throat; no nasal catarrh or stenosis; was not with brother much; never been a milk-drinker to any extent.

August 12, 1890.—Very pale and thin; height, five feet ten and a half inches; weight, one hundred and twenty-three pounds; fingers slightly clubbed; nostrils dilated; able to be up part of the day and go out; respiration 32, pulse 96, temperature 101°; considerable cough and expectoration at night and early morning; tubercle bacilli in sputum; no appetite.

Physical Signs.—Dulness on percussion over upper left front and back; bronchial respiration; bronchophony and thick moist râles over same region; upper right front and back, coarse respiration.

Treatment.—Hypodermic injection of iodine, $\frac{1}{12}$ grain daily; also inhalation of chlorine water and solution of sodium chloride, equal parts daily; also 3 grains each of bone-meal and ferri carbonate three times a day, and a teaspoonful of a syrup of rum, molasses, and paregoric during evening and night to allay cough.

During first week temperature remained higher, 101° during the afternoon, and 103° in the evening and at times in the middle of the day. Complained of weakness and cough, although expectoration was easier. The latter part of August, however, the temperature had fallen to 99.5° and 101°. There were no night-sweats, but considerable diarrhœa and nausea, and soreness of throat. The expectoration had diminished considerably in character, but still contained tubercle bacilli. The dose of iodine, however, had been increased until he was getting ½ grain. At this time hypodermic injections of gold and sodium were substituted for the iodine, beginning with $\frac{1}{20}$ grain. This was continued daily, increasing the dose every second day until $\frac{1}{5}$ grain was reached, which produced nausea and dilatation of the pupils. It was now dropped to $\frac{1}{10}$ grain daily until September 14, when the injections of iodine and gold were used alternately every other day,—⅓ grain iodine and $\frac{1}{10}$ grain gold and sodium. During October, November, December, January, and February

he was subjected to about two to three injections a week, with three inhalations, and during March he has had one injection of gold and sodium, $\frac{1}{5}$ grain, every week, with three inhalations. He has had no medicine *per orem* excepting on a few occasions a cathartic. Since September 10 has walked out nearly every day. Has had no abnormal temperature since early in November. Has very little cough in the morning, and not more than two drachms of expectoration in twenty-four hours, except after being out on a windy day and after inhalation. There are no tubercle bacilli in the expectoration; appetite is good, bowels are regular, digestion is good, and he sleeps well. Physical signs show slight dulness over upper left front and coarse respiration with abnormal transmission of heart-sounds and creaking on forced inspiration. He has also nearly regained his normal weight.

Case II.—E. J., clerk; good hygienic surroundings; single; native of Michigan; lost one brother of phthisis, otherwise family history good. He was generally well until he took cold at a parade in September, 1889, and was sick in bed for three weeks with, he says, pneumonia; since this he has continued to cough, at first without much expectoration, but latterly increasing.

He had been having more or less pain in his chest, especially the left side, and notices an increase of breathlessness upon exertion, and he has never recovered strength or weight since his last illness. His appetite has been fair most of the time, however, and no diarrhœa or dyspepsia appeared.

His principal complaints are a harassing

cough, pain in the chest, and debility, and also nocturnal sweating occasionally.

At the time he was seen he had elevated temperature, rapid pulse, rapid respiration, and was pale and emaciated.

Physical examination of the chest showed dulness on percussion over the whole left side, bronchial respiration, bronchophony over upper right front and back, with a small cavity in the lower portion of the left infraclavicular region showing cavernous respiration with gurgling râles, and tubercle bacilli in his sputum. Right side appeared emphysematous, and the percussion resonance high pitched over the right back, with moist crackling in the right and left interscapular region.

He was sent to Harper Hospital February 18, and treated with inhalations of chlorine gas and the internal administration of Lugol's solution of iodine, extract of malt and whiskey alternated with the salicine and malt mixture, with occasional doses of quinine.

The chlorine gas was administered alone with air and with the sprays of bicarbonate of sodium, bicarbonate of ammonium, petrolina and olive oil, and carbonate of magnesia, but without much effect, as he was unable to bear this until the latter part of his stay, when it was administered with the spray of chloride of sodium, and from March 5 to 25 he received two inhalations daily, and was also put in the cabinet daily during the last week in the hospital.

He continued to improve, and physical examination on March 24 showed the left lung clear, the respiratory murmur returned, the gurgling râles at the seat of the breaking down

had disappeared, leaving a soft, low-pitched, cavernous respiration at that spot, and there still remained a high-pitched resonance on the right side, with a prolonged murmur; much better evening temperature, during the last ten days reaching only 95.5° in the evening; expectoration greatly diminished, but still a good deal of cough, but no nocturnal sweating. Left hospital March 25, and on April 25 went to Colorado and remained until the following August. He presented himself for examination on August 8, apparently very much improved. The physical signs previously noted had disappeared, but broncho-vesicular respiration still remained over the left lung; bronchophony and abnormal heart-sounds were heard in the infraclavicular region. He still had considerable cough night and morning, but had gained flesh and strength, and his appetite was good, also his digestion, and he had no elevation of temperature.

On August 28 he presented himself with increased cough, temperature of 99.5°, and stated that his appetite was diminished and he was restless at night. I ordered a tablespoonful of Parke, Davis & Co.'s emulsion of oil of eulicum three times a day after meals; also hypodermic injections of 1/6 grain of iodine and solution of potassium iodide, which he received every day for ten days, after which signs of abscess appeared at the seat of injection, and this was discontinued.

He also had during this time inhalation of chlorine water, with a solution of chloride of sodium daily. Temperature increased so that he rarely had when examined a temperature

less than 100°, which was probably due to the abscess.

Physical signs showed mucous râles over the whole upper front, with mucous crackling. The abscess was discharging, but finally healed, and the hypodermic injections of chloride of gold and sodium were used instead of iodine on September 18, and were continued until October 2, when, another abscess threatening, this also was stopped; but at this time we succeeded in obtaining from Dr. Clark pure chemicals, and no further trouble arose from abscesses, and he has now been much better. Temperature 98.5° to 99.5°; cough and expectoration very much lessened; strength returning; and from November 6 to February 1, 1891, he has had two injections weekly, and from one to two inhalations of chlorine; during February he has had but one injection of iodine. He seems perfectly well, seldom coughs, and has no expectoration. Expectoration of September 5 contained a few tubercle bacilli, but on examining what little we can collect now, none can be found. He is taking no medicine, is apparently well, and has resumed his occupation.

We have recommended him, however, to reside in New Mexico or Colorado for two or three years.

Case III.—Miss J. C., native of Detroit; school-teacher; lives in good hygienic surroundings, with plenty of good food; not much of a milk-drinker; never very fleshy, nor very strong.

Family History.—She lost two maternal aunts and one sister of phthisis; was not with her aunts or much with her sister during their

illness; was subject to taking cold, but in tolerable condition until about November, 1889, when she "took cold," and continued coughing, having occasionally chills, fever, and night-sweating, and in latter part of December had a hæmoptysis (probably two ounces). From this time she continued to feel badly, although not expectorating much; continued attending her school irregularly. On January 1, 1890, she was in the following condition: Pulse 96; frequent cough and little expectoration; temperature 100°, respiration 26; skin dry; tongue coated; no diarrhœa, but poor appetite; says she is easily tired, and has pain in left chest and shortness of breath upon exertion; menstruation scanty.

Physical Signs.—Slight dulness on percussion over upper left front; bronchial respiration diminished, fremitus, and exaggerated vocal resonance, with dry crackling on forced respiration over same region extending down to third rib.

Treatment consisted of counter-irritation, rest and the administration of quinine and iodoform with creosote, and thymol inhalation. She gradually grew better, and in the middle of February resumed her school duties, which she continued for part of each day. March 1 she felt better, still coughing and having a temperature of 99.5° to 100° at night; appetite better; forced herself to eat because very anxious. During April she did very well, but in early part of May grew worse; had slight hæmoptysis. Temperature ranged daily from 98° to 101°; more pain in chest, and more cough and expectoration; night-sweats appeared and diarrhœa for a few days. She was

treated with quinine and salicin, and rest enjoined; she now resigned her position in the school.

Physical exploration of the chest showed mucous râles over upper left front; expectoration showed bacilli. During May she continued very ill, although up and about a little every day. During this time she had inhalations of bichloride of mercury, creolin, creosote, and resorcin, anodynes to allay cough, and syrup of the iodide of iron, with nutritious food. May 28 to 31 she was worse, having high temperature (at night 104°), anorexia, diarrhœa, and more cough and expectoration. She grew better in a few days, and left the city with friends, about June 15, for the upper part of the State. She remained away until the middle of August, when she returned somewhat weaker, with more cough and expectoration again, and higher temperature; her appetite, however, was better, digestion good, and bowels in good condition. She had taken while away bone-meal and extract of malt, with some whiskey once or twice daily, with nutritious diet. She remained in about the same condition until September 10, when the temperature increased, as also the cough, pain in the chest, and expectoration. She was growing weaker, although yet able to be up the greater part of the day; was very much emaciated and having night-sweats again; hoarse and having sore throat; sputum contained tubercle bacilli.

Physical signs showed mucous râles and moist crackling over upper left and cavernous respiration with creaking at left apex; bronchophony, also broncho-vesicular respiration

and coarse râles over upper right front and over left back. Laryngeal examination showed redness and swelling of the upper larynx, with uniform swelling of arytenoids, ary-epiglotic folds, and ventricular bands, but epiglottis not swollen; no erosion could be seen anywhere. She was now given hypodermic injections of $\frac{1}{12}$ grain iodine daily, and an inhalation of chlorine water and solution of chloride of sodium. The iodine was increased $\frac{1}{6}$ grain the third week, when the gold and sodium was substituted, owing to increased mucous expectoration, diarrhœa, and skin eruptions coming on. After the fourth week she received injections (and a few times the solutions mixed) every other day, every second, third, fourth, fifth, and sixth day, and so on; she now receives one injection every two weeks.

The inhalation of chlorine water was kept up until February 5, since which time she has had none. Occasionally, for a complaint of faucial rawness, she received an inhalation of creolin from a face-shield inhaler. She was treated mostly with the iodine solution, ranging from $\frac{1}{12}$ to $\frac{1}{3}$ grain.

October 18.—She seemed worse, and so continued for about a week, having an exacerbation of fever and chills, with increased cough and expectoration. She had also a remission of high temperature, etc., from November 3 to 6, and again from January 2 to 8, but otherwise has gradually improved in every way until now. Since February 15 the temperature (taken irregularly) has shown no elevation; pulse 80 to 84; appetite and digestion good. She resumed her duties as teacher after the holiday vacation, and has lost no time since.

She has taken little or no medicine per orem since early in January, and the physical signs clearly show retrogression of the process. Her voice is slightly husky, but larynx examined shows only a thickening of the ventricular bands. There is no odynphagia.

CASE IV.—A. P., aged 25; American; married; height, six feet; normal weight, one hundred and seventy-five pounds; present weight, one hundred and twenty-five pounds; farmer three years, formerly cooper; habits good.

Family History.—Good, excepting paternal grandfather died of phthisis. Previous history: Was well until about four years ago, at which time he underwent great exposure, taking cold; says he had pneumonia. Has since that time occasionally expectorated clear blood; has coughed ever since more or less during the winter; for the last year has had fever occasionally; continual discharge from right ear, but not much expectoration until within the last six months, since which time he has been gradually losing flesh and strength. Last three months expectoration has been very considerable. He also had chills and fever, with occasional diarrhœa. Appetite has been capricious. Has not been exposed to phthisical patients.

October 27, 1890.—Pale, very thin; pulse 110, temperature 100°, respiration 28; appetite poor, tongue coated, bowels regular.

Physical Signs.—Percussion dull over upper left front and back; bronchial respiration; bronchophony; moist crackling over small area. Over the left mammary region and over the upper right front, broncho-vesicular respi-

ration; no râles. Examination of sputum shows pus and tubercle bacilli; laryngoscopical examination shows hyperæmia of the upper larynx, with only slight swelling; slight hoarseness at night.

Treatment.—Hypodermic injections of gold and sodium chloride $\frac{1}{30}$ grain every evening; inhalation of napthalin in the inhaling-room twice daily; mixture of salicin, extract of malt, spiritus frumenti, given internally, three times daily at meal-times.

Temperature ranged, up to November 23, from 97° to 98° in the morning to 101° to 102° in the evening; from the 23d to the 30th it greatly diminished, ranging from 98.5° to 99° and 99.5°; from that time to the time of leaving the hospital (December 5), temperature ranged, with the exception of one evening (on the 3d), from 98.5° to 99°. Respiration at this time, from November 28 to December 5, was between 20 and 24; pulse from 76 to 90. Expectoration diminished to about one ounce in twenty-four hours, mostly in the morning. Hypodermic injections were increased from $\frac{1}{30}$ grain to $\frac{1}{5}$ grain. Temperature, taken half an hour after injection of $\frac{1}{5}$ grain, shows increase of temperature of one degree, which did not remain, however, more than half an hour longer. On November 23 one hypodermic injection of bisulphate of quinine (6 grains), was given on account of persistent feeling of chilliness. On November 21 he received a hypodermic injection of iodine, $\frac{1}{12}$ grain, increased on the 23d to $\frac{1}{6}$ grain, which was continued until December 21, when an injection of gold and sodium chloride, $\frac{1}{10}$ grain, was given each day dur-

ing the remainder of his stay in the hospital. From November 20 to 24 he complained of a soreness of the throat; laryngoscopic examination showed increased congestion. The inhalations of napthalin were continued until the 19th, when chlorine gas with spray of solution of chloride of sodium were substituted and continued daily until his departure. Examination of urine during treatment showed nothing abnormal excepting the quantity of earthy phosphates. There was no trouble at the site of the injections in the gluteal regions.

December 2.—There were no tubercle bacilli in the sputum.

December 5.—Physical exploration of the chest showed no râles, but still coarse respiration at the upper left front. Injections of gold and chloride were continued at his home during December and January, at which time (the latter part of January) he was reported as having little or no cough, with gain in body-weight, and feeling perfectly well.

Case V.—T. C. P., aged 33; American; married; resides in city (cottage); habits good,—smokes and chews moderately; occupation, clerk in store.

Family history good. He has been generally well until a few months ago, when he began to cough and expectorated a little in the morning; about six weeks ago this became worse, together with a feeling of heat and restlessness; for the past three weeks has been feeling much worse and obliged to give up work; poor appetite; bowels constipated; feeling of chilliness several times daily, followed with sensation of heat; slight sweats at night

towards morning; pulse 108, respiration 28; tongue coated; feeling of nausea; incessant cough; expectorations small in quantity, thick, and offensive; no tubercle bacilli present; pain in the chest.

Physical Signs.—Dulness on percussion; bronchial respiration and abnormal transmission of heart-sounds over the upper left front down to the third rib; no râles; prolonged and jerky respiration.

Treatment.—Hypodermic injections of iodine, beginning with $\frac{1}{12}$ grain, increased every second day until $\frac{1}{2}$ grain was reached. Inhalations of eucalyptol twice daily in the inhaling-room. Internally, salicin, malt, whiskey mixture, a tablespoonful three times a day; $\frac{1}{4}$ grain codeine in syrup of tolu to allay coughing at night. From November 23 one inhalation of chlorine gas was given daily, and was continued for about ten days on account of irritability of the pharnyx. From November 24 the temperature ranged from 97° in the morning to 100° and 101° at night. From the 24th to the 27th the evening temperature did not rise above 99°. The morning temperature on two occasions was 97° On the 28th, after an injection of iodine, $\frac{1}{2}$ grain, the temperature at 10 P.M. reached 102°. Also on the 29th, after an injection of $\frac{1}{2}$ grain, it reached 102.1°, and during that night copious perspiration and incessant cough; very free mucous expectoration during these two days and nights, with watery discharge from the nose. The following day physical exploration showed mucous râles all over both sides of the chest. The hypodermic dose used was decreased to $\frac{1}{6}$ grain,

and he continued to receive $\frac{1}{6}$ at each injection from this on, with subsidence of these symptoms. Temperature range gradually changed until, from December 2 to 13, the evening temperature ran from 99° to 99.5°; morning temperature, from 97.5° to 98.5°. The pulse range, from November 29 to December 13, was from 70 to 86. Respiration greatly lowered and remained from 20 to 22 from November 30 to December 13, when he left. Examination of sputum on November 21 showed numerous tubercle bacilli; fewer on December 2, and on December 18, five days after leaving the hospital, examination of the sputum showed no bacilli present.

Physical Signs.—On the 1st of December, no appreciable dulness on percussion; broncho-vesicular but smooth respiration; a few distant creaking râles towards the sternum. Physical exploration of chest, December 13, same as above, with the exception of no râles being present. The cough continued at night until about the 1st of February, but with little or no expectoration. He continued to receive iodine injections of $\frac{1}{8}$ grain twice a week up to February 2, since which time he has had no treatment; he appears perfectly well, with no cough, and attending to his duties every day.

Case VI.—A. McL., aged 22; Canadian; single; hygienic surroundings good; habits good; school-teacher.

Family history good. Father died of pneumonia at 57 years of age. She has always been well until attacked with "la grippe" last winter, when she was ill in bed three days with high fever, headache, etc.; never had hæmop-

tysis. Since then she has had continuous cough, with thick, yellowish expectoration and a growing hoarseness of the voice, with more or less pain in swallowing. Improved for a while during the summer, when she was in Ottawa, Canada. Menstruation irregular, and has been growing more so, and scanty. Bowels also irregular for last two months. Chills and fever occasionally, with nocturnal sweating at times. Emaciation has been slow, although sensation of weakness has been progressive.

November 14.—Almost aphonic, breathing rather stridulous; cough short, brassy, and incessant; expectoration thick and yellow, about eight ounces in twenty-four hours; cough also very troublesome at night; some nasal stenosis; temperature 102.2° (8 P.M.), pulse 110, respiration 34; tongue coated; appetite tolerably good, but had difficulty in swallowing food.

Physical Signs.—Examination of sputum showed a few tubercle bacilli; laryngoscopic examination showed swelling of the arytenoids and ventricles, with slight erosion of these, and in other places granular projections; also erosion of the right vocal cord. The glandular tissues of the ventricles seemed to be tumefied. The physical signs showed slight dulness at the upper right lung front and back, bronchial respiration, prolonged expirations, bronchophony; crackling mucous râles in the left infraclavicular region towards the sternum; small area of cavernous respiration and gurgling râles, bronchophony extending to the fourth rib; dulness on percussion over left side behind; no bronchophony.

Treatment consisted in the administration of hypodermic injection of iodine 1/6 grain, immediately preceded by a four per cent. solution of cocaine every day; inhalation of chlorine water with solution of chloride of sodium with face-shield inhaler (1 ounce of the mixture being used at each sitting, which was given four times daily); 5 grains of acetanilide with 4 minims of fluid extract of gelsemium at night; the administration of 15 minims of syrup of iodide of iron in teaspoonful of compound syrup of hypophosphites three times a day.

Temperature ranged, from this time to November 27, at 101.5° to 102.5° up to the 26th, and the pulse from 98 to 115. Respiration from 32 to 26 to the 21st of November, and from the 21st to the 27th from 19 to 26. From the 26th the temperature steadily declined until the 8th of December, when it rose to 102.5° at 8 P.M., and was 97.5° the following morning.

From November 22 to the 26th insufflation of iodoform were used daily in addition to the other inhalation. The syrup of iodide of iron and hypophosphites were discontinued after November 20, and 5 grains of bone-meal in extract of malt three times daily was given instead.

The laryngeal symptoms gradually declined in severity, and a diminution of swelling and a repair of the eroded spots could be observed with the laryngoscope very easily. The voice began to change for the better about December 1, and continued, although hoarse, to grow in strength. The respiration became easier, so that she could exercise without any

difficulty. Coughing grew less, especially at night, from the 30th until the time of her leaving the hospital. Physical signs also improved, so that on December 14 the only râles present were occasional cracklings over the upper right front. The respiration, however, continued to be coarse, and the examination of the sputum on December 3 proved negative. She had occasionally during that time inhalations at night of spirits of chloroform and ether to allay cough, and applications of oleum terebinth; acetanilide and gelsemium were discontinued on the 21st. After that she had salt baths every second night. The evening temperature continued from 99° to 99.5° up to the time she left the hospital on the 24th of December. Expectoration was at this time very much diminished, and she had regained her strength. On November 29 she complained of watery discharge from the nose, soreness of the eyes, and dryness of the throat, with some diarrhœa, which was supposed to be due to the iodine, and chloride of gold and sodium was substituted after that and used until December 11 in doses of $\frac{1}{10}$ to $\frac{1}{5}$ grain, when copious perspiration, supposed to be due to the gold and sodium salts, led to its discontinuance and substitution of the iodine, $\frac{1}{6}$ grain, which was used continuously until she left the hospital. This hypodermic medication was continued at her home for a few weeks, and at the last report from her, the early part of this month, she was perfectly well and had resumed her duties, but was still hoarse, and had now no abnormal temperature at night.

Case VII.—Grace, M. C., aged 16; height,

five feet four inches; weight, one hundred and twenty-eight pounds; native of Michigan; resides in a village; good hygienic surroundings; attended school until the 1st of January, 1890.

Family history of parents good. Patient has one sister and one brother younger, and one brother older, living. Lost one sister, aged 20, of pneumonia (?). Lived in the house with this sister, but was not near her much. She has been well until last July, at the time of the death of her sister, when she began to cough, having chills, fever, etc. Had hæmoptysis. Grew better from this attack, and had become nearly well until three weeks ago, when she took cold and has been quite ill since; has chills, fever, coughing, nocturnal sweating, etc.

November 12.—Anæmic appearance; thin; pulse 120, small; temperature 100.4°, respiration 30; skin clammy; considerable cough and much expectoration of grayish tenacious sputum; bowels regular, poor appetite, no dyspepsia; sleeps well, excepting for cough; menstruation regular, but scanty; no extra discharge from the nose or stenosis.

Physical Signs.—Laryngoscopic examination shows hyperæmia of the larynx and increased mucous secretion; not much swelling; voice good; chest movements rhythmical; percussion dull over lower right back.

Auscultation. — Paddle-wheel respiration, both upper fronts increased fremitus; exaggerated resonance over right lung; loss of respiratory murmur over right back; diastolic cardiac murmur near sternum and the second costal cartilage. Examination of the sputum

showed tubercle bacilli; amount of expectoration has been about six ounces daily.

Treatment.—Chlorine inhalation in inhaling-room twice daily. Five grains of bone-meal in malt extract three times daily before eating; hypodermic injection of iodine, $\frac{1}{12}$ grain, daily. Temperature ranged from 99° to 101° up to the 29th, and the pulse from 100 to 120, excepting on the morning of the 26th, when it was noted at 80; respiration ranged from 20 to 26. During this time the inhalations were increased from twice to three times daily until the 24th, when she complained of some irritation of the throat from them, and they were diminished to two daily. The hypodermic injections were continued at $\frac{1}{12}$ grain, without any symptoms of iodism, until November 22, when the gold and sodium chloride was used alternately with the iodine every other day. The cough and expectoration was lessened, and from November 27 to the time of her departure from the hospital she did not cough at night at all. Expectoration diminished until the 30th, when upon measurement it was found to be one and one-half ounces in twenty-four hours. She left for her home December 18, with very little cough. December 2 and 17 the sputum did not show bacilli. Appetite good, bowels regular. Advised to take occasionally phosphate of sodium as a laxative. Treatment was continued by her physician, Dr. Johnson, for a short time after her return home. He reported on March 11 that she felt well and appeared strong, scarcely any cough or expectoration, but that he found a few bacilli in the sputum. The physical signs December 15 showed dulness on percus-

sion on either side; prolonged and jerky expectoration on both upper fronts and over right back. Broncho-vesicular respiration pronounced over right back and just outside of the angle of the scapula on right side, with cavernous respiration and large mucous râles over an area about the size of a turkey-egg.

Treatment.—Lugol's solution with iodine, 5 minims, in extract of malt just before each meal, and the spray of eucalyptol once daily and one ounce of the mixture of chloride of sodium and water, equal parts, three times a day. One drachm of Rochelle salts in a glass of hot water every other morning if necessary, and inhalation from cone inhaler at night with chloroform and ether.

The temperature kept up until October 29, when the morning temperature began to go down to 96.5° and 97°, with a feeling of chilliness. He was given, on the 30th and 31st, hypodermic injections of 6 grains of bisulphate of quinine. On the 31st of October the injection of eucalyptol was discontinued, on account of a slight soreness of the throat; inhalation of one ounce of bichloride of mercury solution, 1 to 3000, was given three times a day, with the face-shield inhaler, for three days, when the chlorine-water inhalation was resumed. Temperature range remained from 98.5° to 99.5° until the 10th, when the evening temperature ran up to 100.5° and the pulse to 98, with no sign of chilliness, however, and no sweating. He is now showing some signs of iodism by increased discharge from the nose, which, however, passed off in a day or so. He now receives hypodermic injections every day, $\frac{1}{8}$ grain gold and sodium chloride, from which

time up to the 16th of November temperature never rose above 99.2°. His appetite has now improved; expectoration diminished more than one-half; he felt much stronger; though still short of breath, he could breathe much better. From the 10th to the 16th he was also placed in the pneumatic cabinet once daily for four minutes, during which time the pressure was diminished two inches. On the 16th he was obliged to leave the hospital for home. Hypodermic injections were kept up for a short time. He reported in February as feeling very much better, with very much less cough, especially at night, and very much less expectoration. On the 14th physical exploration of the chest showed evidence of emphysema, but at the region of the right shoulder-blade the large mucous râles have entirely disappeared, and nothing but low-pitched cavernous respiration mark the seat of the breaking down of the lung tissue.

Case IX.—M. M.; aged 22; native of Canada; printer; single; lives in a cottage in the city, unpaved and shady street; habits good.

Family history good. Has been feeling ill for about eighteen months with dry cough. Pain both sides of chest. Expectoration of yellowish-white, thick sputum, streaked with blood occasionally. Never had any regular hœmoptysis. Had sweating at night lately, although after a coughing spell on first going to bed sleeps very well. Appetite has been capricious and bowels irregular, sometimes constipated, sometimes loose. Has felt sense of growing weakness, being short of breath for the last four months.

December 6.—Transferred from the out-patient department to the hospital. Pale, somewhat emaciated; pulse, 110, small; temperature 100.5°; respiration 40; skin clammy; tongue coated; complains of dull erratic pains both sides of chest. Feels quite weak most of the time; inclined to lie down. Coughs considerably, especially in the evening and morning. Expectorates about half a pint a day by estimation; sputum contains tubercle bacilli. Voice good; no pain on swallowing, no soreness of the throat; no extra discharge from the nose or stenosis. Has not been in any way associated with anybody who had phthisis of the lungs.

Physical Signs.—Dulness on percussion over the upper half of right lung; bronchophony; broncho-vesicular respiration with prolonged expiration and increased fremitus over this region. Large mucous râles and mucous creaking over the right infraclavicular region. At the upper left, creaking respiration with abnormal transmission of heart-sounds; broncho-versicular respiration over rest of the lung.

Treatment.—Inhalation of chlorine gas with chloride of sodium twice a day. Hypodermic injection of gold and sodium chloride, $\frac{1}{50}$ grain, every day, increasing daily to $\frac{1}{8}$ grain, which was reached on the 10th, when it was stopped and resumed again on the 12th in doses of $\frac{1}{20}$ grain, with orders to increase to $\frac{1}{10}$ after the next day, at which time he had profuse sweating, nausea, with dilatation of pupils and vertigo, when the hypodermic injection was stopped. Compound tincture of cinchona, with 5 grains of bone, was given three times a day.

The temperature range was from 97.5° in the morning to 100.5°, 101°, up to December 16. On the evenings of December 8 and 9, however, temperature went up to 102.5° and 101.5°, respectively. Respiration from December 11 to 15 ranged between 29 and 40. He had chills followed by some fever from the 8th to the 14th daily. Nocturnal sweating continued more or less until the second of January. The temperature from December 30 to January 11 ranged between 98° in the morning to 101° in the evening. Respiration varied from 24 to 36. Pulse, however, became less frequent, ranging between 76 and 86. On December 6 he began having hectic fever daily, and on the 7th, 8th, and 9th hypodermic injections of bisulphate of quinine were given, with apparently no effect. He coughed very much at night up to December 9, when cough and expectoration somewhat decreased, the bulk of expectoration growing gradually less. He seemed to hold his strength about the same.

The physical signs showed no improvement, and on the 11th of January there were mucous râles, with increased area of bronchophony over both right and left lung. He left the hospital on January 14, and was feeling stronger and better generally, but there were still numerous tubercle bacilli in his sputum, and the lungs did not seem to clear up. The treatment was not kept up since he left the hospital, and we have heard he is gradually failing.

Case X.—B. J., aged 17; Canadian; doing housework; single; hygienic surroundings tolerably good, though living in a cottage; good habits.

Family history good. Father died of Bright's disease. She has been ill since last Christmas, at which time she caught cold, with cough, expectoration, headache. Coughed and expectorated mostly in the morning. Expectoration yellowish in character. This has been increasing until last month, when she has felt very weak, and suffered considerably with fever and chills. Appetite has been tolerably good; pulse regular; menstruation regular until the last two months, when they were absent. She has not slept well of late at nights. Says she had pleurisy on the left side for two weeks. Never had hæmoptysis; not sweating lately; vomiting and diarrhœa frequently.

December 24.—Appearance healthy; cheeks rosy, not emaciated; respiration 38, pulse 108, temperature 101°; coughs and expectorates a great deal. Expectoration contains much caseous matter and tubercle bacilli.

Physical Signs.—Gurgling and large mucous râles; pectoriloquy over the upper left front and back down to the fourth rib, showing a large cavity in this situation. Bronchophony; bronchial respiration; dulness on percussion over the left front and back; bronchial respiration, but no râles, over the right front and back.

Treatment.—Chlorine inhalation; chloride of sodium twice a day; hypodermic injections of iodine, $\frac{1}{6}$ grain, daily; salicin and malt mixture three times a day before eating; beer and whiskey to drink three times a day; 5 grains of acetanilide every night.

Temperature ranged ftom 97° in the morning to 103° most of the time until December 3, from which time there was a gradual dimi-

nution until the 22d, when copious diarrhœa with intestinal pain began, which became practically uncontrollable. During this time the temperature ranged from 99° to 103.5° to 104.5° up to the time she left the hospital, which was February 2.

The hypodermic injections were carried up to 1 grain, which seemed to produce abundant mucous expectoration, aching of the limbs, and increased temperature, and it was changed on the 28th for chloride of gold and sodium, which was used alternately with bisulphate of quinine hypodermically. The chlorine inhalations were kept up until the 9th of January, when they were stopped on account of causing excessive pain in the chest. The examination of sputum on January 5 showed a diminution of bacilli, but some blood. Diarrhœa began about the 18th of January, and continued more or less unabated, notwithstanding the administration of strong astringents. During this time Mosquera's food, meat, and stimulants were freely used, but apparently with no effect. The physical signs showed a progressive breaking down of the left lung until the time she left the hospital. Gurgling râles, cavernous respiration, and pectoriloquy could be heard almost everywhere over the left side of the chest, while the right side of the chest showed large mucous râles and bronchial respiration and bronchophony throughout the whole upper third. She died at her home on February 12. No post-mortem examination was held.

This case is remarkable for the rapidity of its progression, although undoubtedly more than one-third of the right lung was consolidated at the time of her entrance to the hospital; still

sion and noisy respiration over upper right front and weakness of respiration murmur over right back; no râles.

Case VIII.—A. S., aged 40; Canadian; occupation, farmer for last ten years, previous seven years stone-cutter; married; has five healthy children; resides on lake shore in a salubrious situation; uses a good deal of tobacco; takes whiskey and beer frequently.

Family history good. Previous history: He has been well, although subject to taking cold and having attacks of dyspepsia; had ague some time ago. Been coughing for fifteen years more or less in the winter, which cough would leave in warm weather. Never had hæmoptysis, although has expectorated bloody mucus. Has generally expectorated a great deal of yellowish-green, thick sputum. Never had fever and chills until of late. Had been feeling weaker lately and short of breath for the last year. Has noticed slight emaciation. Appetite poor for the last six months. Not been able to work since the 1st of September, since which time he has had chills and fever almost daily, with pain in the chest and increased breathlessness.

October 23.—Temperature 99.6°, pulse 80, respiration 22. Estimated expectoration, nearly a pint in a day; expectoration contains tubercle bacilli. Voice good; no soreness of the throat. Continual pain in the chest and feeling of constriction, especially after slight exercise. Appetite poor; bowels constipated; tongue coated; skin dry.

Physical Signs.—Laryngoscopic examination showed no change excepting abnormal amount of secretion in larynx. No dulness on percus-

the treatment seemed to have no effect whatever in stemming the progress of the disease, although the diminution of tubercle bacilli during the time she was having the chlorine-gas inhalations frequently would indicate a marked result from that form of application.

Case XI.—T. G., aged 40; American; occupation, barber; widower; hygienic surroundings and habits good.

Family history good. He was a soldier in the Union army. Says he has never been very well since. No particular complaint until four years ago, when he began feeling debilitated. Says he has been quite ill for two years with occasional chills and fever, debility, and slight hacking cough. During the past year the cough and expectoration has increased, especially during the winter. Says he had "la grippe," since which time he has been much worse; and last winter had an attack of hæmoptysis, about half a pint having been expectorated; four weeks ago another (about one ounce in quantity), and two weeks ago still another attack (about one ounce). Has had more or less indigestion and diarrhœa for the past eight months. Does not sleep well. Last winter lived in California, but last summer, and up to the time of coming to Harper Hospital, lived in Texas. Appetite has been capricious.

January 12, 1891.—Condition: Tongue cracked and red; mucous membrane of mouth injected, with sensation of dryness; voice good; complains of slight soreness of throat; sputum tenacious, yellowish-gray color; says he cannot sleep on account of cough; bowels loose (three to five stools per day); ten-

derness and flatness of abdomen. Patient is very much emaciated, and unable to walk more than a few yards. Temperature 100.2° on evening of January 12, pulse 80, respiration about 28.

Examination of sputum, made both January 13 and 15, showed presence of tubercle bacilli. Presence of cavity, shown by pectoriloquy, and cavernous respiration, with dulness on percussion over right infraclavicular and supraclavicular regions. Over left supraclavicular and infraclavicular regions, broncho-vesicular respiration and a few moist râles. Over left infrascapular region there was broncho-vesicular respiration, but no râles. Over right scapular region there were moist râles, bronchophony, and exaggerated murmur.

Treatment.—Injections of iodine $\frac{1}{24}$ grain, gradually increased each day; inhalations of chlorine gas twice daily; pepsine before each meal; Squibb's diarrhœa mixture three times daily after meals; Mosquera's food, one drachm in boiled milk, every four hours. The injection was increased until the dose of iodine reached $\frac{1}{3}$ grain on the 22d, when, symptoms of coryza, dryness of throat, and scantiness of urine coming on, it was substituted by $\frac{1}{5}$ grain of chloride of gold and sodium every night until the 26th; after this $\frac{1}{2}$ grain of iodine and $\frac{1}{5}$ grain of gold and sodium were given on alternate nights. On the 16th and 20th, half an hour after the injection, the temperature rose to 101.5°. On the 25th and 26th, there being nausea and vomiting after inhalation of chlorine, they were stopped for two days, and then resumed. The temperature steadily decreased, excepting from the 16th to the 21st, when the

evening temperature was 99.2° and the morning 98°. On the morning of the 24th he had a slight chill, the temperature afterwards reaching 100°. On the 25th, 26th, 27th, and 28th, chilliness each morning, with evening rise from 99.5° to 100°. On the evening of February 5 the temperature rose to 100.5° after an injection of iodine. It also rose on the 7th after an injection. From this time on he rereived the inhalations of chlorine but once daily. From January 5 to February 9 there was a steady decrease of temperature, as well as pulse and respiration rate. From the 14th of February the temperature was never above 99° in the evening, and 98° to 98.5° in the morning, with two exceptions,—viz., on March 5 and 7, respectively, the temperature rose to 100° in the evening, accompanied by slight diarrhœa. A hypodermic injection of bisulphate of quinine was given on the morning of the 7th. From that time the temperature varied from 98° in the morning to 99° and 99.5° in the evening. He had regained much strength, weighed eight pounds more, and could walk about very well. He had very little cough,—in the morning only,—and he expectorated but about two drachms, while the sputum showed no tubercle bacilli.

Physical exploration of the chest at this time showed no moist râles; but creaking coarse respiration over the region of former lesions.

Case XII.—Miss T. F., aged 21; American; single; has had good hygienic surroundings of late; has been doing housework for the past twelve months. The year previous was clerk in an office.

No tuberculous family history, but father, paternal grandmother, paternal grandfather, and maternal aunt died of cancer, all at advanced ages. She was generally well until last winter, when she was attacked with "la grippe," and was confined to bed four days and disabled for three weeks, suffering from severe cough. In April she became nervous or hysterical, but recovered from this in a few weeks, and resumed work, working hard for about five weeks. In July she was taken sick with *supposed* peritonitis, from which she slowly recovered, and was then "taken down" with so-called "mountain fever," after which she never seemed to have regained her strength. About four weeks ago she began coughing much, and expectorating greenish or yellowish tenacious sputum. She had not menstruated for three months. Her appetite was at first capricious, then almost absent; bowels alternately constipated and loose; sleep very much disturbed by coughing and sweating. She has been growing very weak and emaciated; has considerable pain in chest; never had hæmoptysis.

November 17, 1890.—Condition, weak, pale, emaciated, and able to sit up but for a short time each day; bowels constipated; anorexia; nausea; tongue coated, with red edges; respiration 40, pulse 90, temperature 103.5° (P.M.); has considerable pain through left side of chest and over right hypochondriac region, the abdomen being rather full and tympanitic; considerable cough with abundant expectoration of tenacious yellowish or grayish sputum, teeming with tubercle bacilli.

Physical exploration of chest showed dulness

on percussion over whole left chest behind, and upper part of right front; bronchial respiration over upper right, and whole of left side; large mucous râles, and moist crepitation over lower left, behind, left apex, and upper right front; abnormal transmission of heart-sounds and increased fremitus. At right axillary region and at left infrascapular region, gurgling râles and cavernous respiration, with marked bronchophony, and whispering pectoriloquy over a small space of the left mammary region; slight swelling (œdema) of feet.

Treatment.—Hypodermic injections of iodine 1/6 grain, gradually increased to ½ grain; inhalations of chlorine once daily. From 17th to 24th, morning temperature ranged from 98.5° to 99.5°, and evening temperature from 103° to 104.5°. Respiration ranged during this time from 25 to 35, pulse from 90 to 120. On the 23d, at 9.30 A.M., the temperature went down to 97.5°, and rose at midnight to 104.5°. From this time to the 29th the temperature ranged from 98° in the morning to 100° and 101° in the evening. On the morning of the 29th a severe chill, followed by a rise to 104° at 6 P.M. A hypodermic injection of iodine, 1 grain, was given at 6.30 P.M., and from this time to the 5th of December the afternoon temperature did not go above 101°. The iodine was substituted, on the 5th, by chloride of gold and sodium on account of acne appearing. Nocturnal perspiration was excessive most of the time during this period and was controlled by atropia or agarcine. From this time to the 15th the evening temperature ranged at about 101.5°; occasionally 102°. Morning temperature went below 98.5°

only three times. Acetanilide was given in the evening whenever the temperature rose above 101°. The respiration gradually diminished up to the 15th, ranging between 24 and 30. Bowels during this time were more or less constipated; tenderness of abdomen kept up more or less of the time; also pain in chest, sometimes severe. After the 15th, hypodermic injections of iodine and chloride of gold were used alternately until the 23d. The inhalations of chlorine were given every other day. Hypodermic injections of bisulphate of quinine were given on the 15th, 17th, and 19th: they seemed to shorten the hectic fever very much. During this time the expectoration was very profuse, containing much pus, also bacilli. From the 14th to the 29th the pulse fluctuated from 90 to 126 and 130. Temperature was also very irregular, and so continued up to January 1. On December 24 and 30 it reached 105°, the following morning going down to 97°, and accompanied by a chill and nausea; respiration was quite regular, ranging from 20 to 26; nausea, and excessive diaphoresis frequent. From the 26th to the 31st she suffered from copious diarrhœa, followed by increased œdema of the feet and great debility. Injections of chloride of gold and sodium were suspended during this period. On January 1 hypodermic injections of gold were resumed, $\frac{1}{10}$ grain being given night and morning up to the 6th. On account of vertigo, nausea, and sense of constriction of body, they were again suspended. From January 1 to 7 the morning and evening temperature steadily decreased, ranging from about 98.5° to 100°. On the morning of the 7th she had a marked chill, the tem-

perature rising to 104°; after this, expectoration was more copious and yellowish in color; pulse still feeble, ranging from 90 to 110. From the 7th to the 31st she continued to feel much better, the œdema of feet had increased, and there was ascites. Bowels remained somewhat loose; appetite increased. She was given bone-meal and malt ale through December and January with Mosquera's food; was given codeine at night, when necessary, and each hypodermic was preceded by one of cocaine. She steadily progressed without relapses until February 1, when the temperature rose again, expectoration increased, and was accompanied by pain in the chest. On February 7 she again began to improve; on the 13th and 18th she had a high rise of temperature. Ferri carbonate was now added to the bone-meal, on account of the anæmia. Patient was now having one passage of the bowels daily. Coughing had very much diminished, being present in the morning only. Sputum still contained tubercle bacilli. She grew stronger during February, with dropsy disappearing, but the temperature still kept up. Pulse, although frequent, ranging from 90 to 100, was growing in tension. From March 8 improvement still was more rapid. Bowels regular; œdema and ascites gone; appetite voracious; cough almost disappeared, and expectoration amounting to but little more than one drachm daily, of glairy mucous character. Temperature has been steadily decreasing since, and from March 4 to 23 the evening temperature has been about 99.5° to 100° every third or fourth day. Since March 23 it has lowered some, and since the 25th has never been above 99.5°; pulse still frequent

but gaining in tension; respiration 20 to 25. Since March 10th she has been walking about the corridors and ward, and says she feels "perfectly well." Sputum on March 20 still showed a few tubercle bacilli.

Physical signs on February 15 showed scarcity of moist râles, and a decided diminution of areas of bronchial respiration with some dry râles. On March 10 no râles excepting dry (creaking and sibilant) in different parts of chest; is rather asthmatic; respiratory murmur, however, was still hoarse. At this writing, March 26, there seems a very good prospect of recovery, she having had no serious relapses for some time. This case seems remarkable, as it had been diagnosed as general tuberculosis by several physicians, and when she entered the hospital no one of the members of the staff who saw her entertained any hope of her recovery. She will leave for her home in the central part of the State in about one week. Menstruation has never recurred. She is now taking bone-meal, with carbonate of iron three times daily, and hypodermic injections once a week. No inhalation of chlorine has been given since March 1, excepting what is diffused in the atmosphere of the ward four times every day.

Case XIII.—Fred. V., aged 28; farmer; married, damp surroundings; poor circumstances.

Family history good. He was never fleshy. Was tolerably well until three years ago, when he began coughing, and has coughed and expectorated ever since, more or less, for the last six months; has had fever and chills, nocturnal sweating, and is losing weight; also micturates

frequently; expectoration streaked with blood occasionally, but has never had hæmoptysis. He has never been exposed to pthisical patients.

December 31.—Transferred from out-door department of Harper Hospital. Appearance pale and thin; respiration 32, pulse 86, temperature 101.5°; skin moist; bowels regular; appetite poor; shortness of breath on slight exertion; erratic pain in chest and abdomen; tubercle bacilli in sputum; urine contained oxalates.

Physical Signs.—Chest small; movement short and rapid; respiratory movement diminished; percussion sound high pitched over right side; increased fremitus; bronchial respiration; bronchophony; mucous click and subcrepitant râles over upper right front and back; increased fremitus and bronchial respiration; bronchophony over upper left chest. Laryngeal examination showed very slight œdema of larynx.

Treatment.—Hypodermic injections of iodine, $\frac{1}{12}$ grain, every evening, increasing to ½ grain; chlorine inhalations (two drachms of chloride of lime) twice a day; dilute hydrochloric acid, 10 minims, three times a day before eating; linimentum olei tiglii et olivæ to chest. From December 31 to January 14, temperature ranged from 98° to 98.5° in the morning, and 101° to 101.5° in the evening, reaching 102° on the 7th, 8th, and 10th, after injections of ½ grain iodine on the 7th and 8th. Pulse 108; respiration ranged from 20 to 30 and 34. On the 10th he had pain in the abdomen and was restless; also had diarrhœa, having four stools in the day and two at night,

and a watery discharge from the nose. Expectorates very much, increasing up to the 9th, when it began to decrease. On account of nausea following chlorine inhalations, they were first diminished, then discontinued from the 14th to the 18th, and were then resumed and a smaller quantity of the gas evolved. Hypodermic injections continued on the 18th at 1/6 grain; on the 20th severe nausea and vomiting occurred, and 1 drachm of Hoffman's anodyne was given every night for a few nights; temperature ranged, from the 15th of January to the 10th of February, from 98.5° in the morning to 99.5° in the evening, excepting on the 26th, 27th, and 28th, when it reached 101°; there was very little night-sweating at this period.

Physical examination on the 11th of January showed bronchial respiration, with no râles except on forced inspiration on the 9th of February.

Auscultation showed still more clearing, but with some slight moist crackling over left clavicular region. On the 25th of January the hydrochloric acid was discontinued, and a tablespoonful of malt ale (Parke, Davis & Co.'s) three times a day was given. He is still increasing in strength and has much less expectoration, and the stomach is less irritable. (Received this latter report from his physician March 20, 1891.)

Case XLV.—Bernard R., aged 63; German; married; occupation, farmer; hygienic surroundings fair; has been in the habit of drinking considerable beer.

Family history good. He has had cough since April, 1890; expectorates considerably,

especially in the morning; is growing weaker; having lost thirty pounds in the last four months; has a very poor appetite, sleeps tolerably well, and has no dyspepsia or diarrhœa; "sore throat," especially at night, and hoarseness.

December 30, 1890.—Physical examination of chest showed respiratory movement diminished. Over whole left front and back, prolonged expiration, diminished vocal fremitus; paddle-wheel respiration, heard at the left lower back; broncho-vesicular respiration over the right front. Laryngoscopic examination showed hyperæmia of pharynx and upper larynx, with swelling of arytenoids and epiglottis. Respiration 24, pulse 90, temperature 90°; sputum contained tubercle bacilli.

Treatment.—Inhalations of chlorine from a face-shield inhaler twice daily. January 4, began hypodermic injections of $\frac{1}{12}$ grain iodine every day, and bone-meal with malt ale given three times a day. Temperature ranged from 99° to 100° in the morning, and from 102° to 102.5° in the evening, up to January 10; pulse was for a while from 60 to 80; respiration from 20 to 32. The general symptoms grew better; respiration clearer. Temperature ranged from 98.5° in the morning to 99.5° in the evening right along. The dose of iodine was increased to $\frac{1}{3}$ grain, which, however, produced eruptions and coryza, with increased soreness of throat, and this dose was therefore diminished. The soreness of throat continued, although the laryngeal swelling and expectoration had greatly diminished. He took the chlorine inhalation very well throughout, and from January 3 to January 12 had at evening a

spray of a four per cent. solution of cocaine. He left the hospital January 15, very much stronger, with less cough and expectoration, but with the sputum still showing the presence of a few tubercle bacilli; he was also still somewhat hoarse. He returned February 7, 1891, somewhat worse, having taken a severe cold from being exposed to a storm. His temperature was 99°, and his throat much worse. From February 7 to 16 the temperature ranged from 99° to 99.3°. On the 15th and 17th it was 100.5° and 101°; the latter rise was probably due to the hypodermic injection of ½ grain of iodine. He complained of more soreness of throat from the 7th to the 20th. Laryngeal examination showed the larynx to be more hyperæmic and swollen, but showed no ulceration. He took daily two inhalations of chlorine water and solution of salt from the face-shield inhaler. He received hypodermic injections daily of ⅙ grain of iodine from the 17th on.

The temperature gradually grew lower and more even, ranging from 98.5° to 99°, excepting on the evening of the 3d and 4th of March, when he received some depressing news from his home. He left the hospital on March 6, feeling much better, but still complaining of a little soreness of throat. The hypodermic treatment, but not the chlorine inhaler, has been kept up at his home. At the last account, March 20, he was still improving, although temperature was not normal.

Case XV.—Mrs. M. B., aged 25; American; married; occupation housewife. She had "la grippe" last winter, and has coughed considerably ever since, expectorating a thick,

yellowish sputum. Has been worse the last ten weeks. Has complained of pain in the feet for eight weeks, amounting to neuralgia. Appetite good; has constipation; does not sleep well.

Family History.—A sister, aged 21, died of consumption last summer. Father died of inflammation of the lungs, aged 53. Otherwise, family history is good. Menstruation regular, excepting for the last two months.

November 29.—Condition: Not able to be out of bed much. Temperature, 101.2° in the evening, 99.6° in the morning; pulse 100, respiration 26.

Physical Signs.—December 14, bronchial respiration and bronchophony; moist râles over left supraclavicular mammary and axillary region, and over left back, also coarse respiration over whole right lung; analysis of urine showed no albumen, casts, nor sugar, but pus corpuscles, bile pigment, and mucus; color light and transparent. Examination of sputum, after staining, showed numerous tubercle bacilli; copious perspiration, distressing pain in feet, and cough.

Treatment.—December 1, ammonium iodide, 5 grains, with syrup of tolu, four times daily, was prescribed for cough. On December 10 the patient was removed to phthisis ward, and on December 12, hypodermic injection of iodine (⅙ grain) and atropine sulph. ($\frac{1}{150}$ grain) was ordered every night. From time of entrance, morphine sulph. had to be frequently given for pain and restlessness. On December 13 the injection of iodine was increased to ⅓ grain. On December 19 the temperature went up to 104.2°; pulse 122.

She complained of severe pain in right side of chest. On December 20 an injection of gold and sodium chloride ($\frac{1}{10}$ grain) was ordered in place of the iodine. On January 15 $\frac{1}{8}$ grain every day was ordered. Patient continued to be more or less troubled with pain in right side of chest and in the feet. On January 14 he had a severe chill and a hypodermic injection of bisulphate of quinine was ordered. On January 2 extract of malt (2 drachms), spiritus frumenti (2 drachms), and bone-meal (3 grains) was ordered three times daily. On January 19, 3 grains of salicylate of cinchonidia, three times daily, was ordered, and all other medication stopped. On January 21 she had slight hæmoptysis. January 26 (A.M.), temperature rose to 102.8°, and on January 27, a hypodermic injection of gold, $\frac{1}{10}$ grain, every two days; then ⅓ grain. On the morning of February 6 her temperature was down to 98° On February 8 she complained of soreness of throat, and oil of eucalyptol, two drachms three times daily, after meals, was given by inhalation, and a hypodermic of iodine, ½ grain every other day up to February 15, when the hypodermic injections were discontinued for three days on account of diarrhœa. On March 5 a menthol spray (two per cent.) was ordered three times daily for increased odynphagia. Temperature range continued most of the time from 100° to 102°. On February 15 (8 P.M.) it rose to 103.2°; the next morning it went down to 99.2°, then continued from about 101° to 102° until February 25 (A.M.), when it rose to 103°, followed by profuse sweating. March 4 (P.M.) it rose to 103.2°. The temperature also ranged high on March 14 and 15 (P.M.). An exam-

ination of sputum on December 18, after staining, showed many tubercle bacilli. On January 19 the character of the sputum changed for the better, showing fewer bacilli. On February 9 and 17 there were still fewer bacilli. On March 5 the bacilli were present in the sputum, but very scarce. Her throat was very sore, the epiglottis, arytenoids, and ventric bands being ulcerated. Her pulse was very weak. She was scarcely able to expectorate, and had great tenderness of the abdomen, and diarrhœa. The skin was constanlty wet, and mouth sore and hot. The emaciation was extreme. During January she seemed to improve very much, cough and expectoration diminished, and she improved in appetite and strength, but from the middle of February on she progressively declined. The laryngeal symptoms came on late. She died March 17. The autopsy revealed tubercular nodules throughout both lungs, in intestines, mesenteric glands, and larynx, with numerous excavations in left lung and fewer in right. There was, however, a notable dryness to the pulmonary tissues. Later on we shall publish fuller details of the morbid anatomy of this and two other fatal cases.

Case XVI.—F. D. H., aged 36; American; married; had one child; hygienic surroundings excellent; habits good, except that he has used morphine rather freely, sometimes one grain daily for the last three months; occupation, stock-dealer; hard worker; been compelled to give up work entirely for the last two months.

Family History.—Lost two paternal uncles and one aunt from phthisis, and one brother

from the same disease. Two half-sisters of his mother also died with phthisis.

Previous History. — Patient never very strong. Between the age of 15 and 17 had four copious hemorrhages from the lungs, but was not much confined to bed until two years ago. Has had frequent hæmoptysis since then, varying in amount from one or two ounces to a pint. Says he has had slight cough since 15 years of age, which has grown much worse lately. Since having had "la grippe," last winter, has been still worse, with frequent night-sweats. During the past year has had ten or twelve superficial ulcers on the legs, which discharged a week or two before healing; no specific history. Appetite and digestion poor; has not been able to digest milk, oils, or fatty meats; constipated most of the time. Does not sleep well; has more or less pain in chest, and more or less shortness of breath, at times amounting to dyspnœa.

January 29, 1891.—Condition: Very much emaciated; tongue coated; panting respiration; very weak, cannot walk much; skin moist; rather anxious expression of countenance. Respiration 28, pulse 100, temperature 99° (A.M.). Considerable cough, but not a great deal of expectoration. Examination of sputum showed no tubercle bacilli. Urine rather scanty, shows presence of albumen and pus.

Physical Signs.—Bronchial respiration, bronchophony, and prolonged expiration over the left apex, with mucous and sibilant râles all over the supraclavicular and axillary regions; bronchial respiration and mucous and sibilant râles over the left infraclavicular and mammary

region and over the left back. There were also dry, creaking râles, prolonged and jerky expiration over upper right front, with coarse respiration behind. Percussion resonance was generally duller all over the chest.

Treatment.—On the night of January 29, owing to pain and dyspnœa, a hypodermic of morphine, ½ grain, was given, followed by $\frac{1}{10}$ grain of iodine. Hypodermic injections of iodine were continued daily, and gradually increased until February 7, when ½ grain was given. This was repeated on the 8th and 9th, when cutaneous eruptions, coryza, and profuse watery expectoration, with dryness of throat, supervened, and it was diminished to $\cdot\frac{1}{6}$ grain. A few days later it was increased to $\frac{1}{6}$ grain again, and so continued up to the time of his departure. On account of shallow chest expansion, the cabinet treatment was commenced on February 6, at first, once daily for two minutes, with two inches diminution of pressure, and gradually increased to two sittings daily, of four to five minutes each, with a diminution of three to four inches pressure. Temperature ranged between 98° and 100.5° (P.M.) up to February 2, at which time the evening temperature rose to 99°, and on the following day returned to 98.5°. This range of temperature contined, excepting on the 7th and 16th, when it rose to 100° and 100.5°, respectively. On the 16th he suffered considerably from dyspnœa, presenting the clinical appearance of asthma. This asthmatic character continued more or less of the time until his departure, March 9. He had slight hæmoptysis half an hour after leaving the cabinet on February 16. On February 9 physical exploration of the chest showed disappearance of moist râles over

the left chest, but dry, crackling râles over left upper front and back, with creaking and jerky respiration over upper right front. Physical exploration on February 16 showed sibilant râles, generally over the left lung, and over upper right front. The pulse ranged between 80 and 100 after February 9, increasing to 110 on the 18th, after a long walk for him. When he left the hospital, March 9, he had gained about eight pounds. His general strength, he said, was better than for two years. He was able to walk half a mile easily, his appetite improved, and his digestion was very much better. He had received no anodyne medication excepting on two or three occasions, and no stimulants except malt ale (Parke, Davis & Co.'s) three times daily. His nourishment for the first two weeks consisted of beef-tea, meat-balls, Mosquera's food, and eggs. The only internal medication he received was 5 grains of bone-meal three times daily, excepting, February 9, 10, 16, and 17, a few doses of salicylate of cinchonidia. At no time were tubercle bacilli discovered in his sputum. No inhalations were given until February 18, from which time inhalations of chlorine were given daily.

This was undoubtedly a case of so-called chronic catarrhal pneumonia. We have heard since his return home that he is still improving. He receives one hypodermic injection a week of ⅙ grain of iodine.

Case XVII.—K. C., aged 32; Canadian; married; mother of five children; hygienic surroundings have been good; habits good; occupation, housewife.

Family history good. She had "la grippe,"

she says, last winter, and has not been well since, although always in "good health before." Has had cough ever since, with expectoration, which lately had become quite free. Had hæmoptysis three months ago, when about one pint of blood was expectorated. Felt better for a while after that. Menstruation ceased five months ago. Appetite good most of the time; has had indigestion at times, and constipation continuously. Has not slept well. Has had considerable pain in left side of the chest, not confined, however, to any particular spot.

January 2, 1891.—Respiration 22, pulse 96, temperature 99.5°; poor appetite; constipated; feels very weak, although able to be up and about. Examination of sputum shows many tubercle bacilli; cough harassing, with "heavy" expectoration.

Physical exploration of the chest showed no appreciable dulness on percussion; respiratory movement rather panting. Large mucous râles, bronchial respiration, and bronchophony at upper right front and interscapular region. Small mucous râles with prolonged expiration over upper left front. Some dulness on percussion in the lower part of the left axillary region.

Treatment.—Inhalation of chlorine gas twice daily; injection of iodine, ½ grain, every evening; bone-meal and malt-salicine mixture three times a day; bromide of potassium (15 grains) at night if necessary; mustard paste on left side of chest. In the morning, January 3, she had a long chill, temperature going down to 97°. First hypodermic injection given on the evening of January 2.

Temperature ranged from 98.5° in the morning to 98.5° to 99.5° in the evening, with the exception of the 5th, 6th, and 7th, when the evening temperature rose to 100.5°. A rise of temperature seemed to follow each injection, and after the 7th the hypodermic injections were given between 4 and 5.30 P.M. No further chill occurred until the mornings of the 23d and 29th. Upon examination by Dr. Carstens, it was found that the patient was pregnant! On this account the dose of iodine by hypodermic injection was never increased beyond $\frac{1}{12}$ grain. On the 10th she began to have considerable nausea in the morning, for which extract of hyoscyamus and bismuth were given, and Mosquera's food every four hours. Evening temperature gradually dropped to 99°, with the exception of the 23d and 30th, when it ran up to 100.5°. The cough greatly diminished, excepting in the early part of the night, when it was quite troublesome. Expectoration diminished so that when she left the hospital, February 6, she did not expectorate more than one ounce in twenty-four hours. The character changed from heavy muco-pus to a frothy mucous sputum. There was no diarrhœa during her stay in the hospital, and improvement of her general strength was quite marked. She left, February 6, very much improved, and went to her home near Buffalo. Since that time she has been under the care of her physician in Buffalo, who reported a short time ago, however, that she was considerably worse. No symptoms of threatened abortion were manifested while at Harper Hospital. It is evident that in this case pregnancy offered no protecting influence. Had we dared to

push the treatment, perhaps better and more durable results might have been obtained.

Case XVIII.—M. B., aged 28; native of Michigan; dressmaker; single; hygienic surrounding good; thin, but of good color; height, five feet three-quarters of an inch; weight, one hundred and seven pounds. Despondent temperament. She had been working very hard, and late at night, for some months.

Family history good. She has been formerly in good health; three and a half years ago she had an attack of sore throat lasting a week, accompanied by soreness of the neck and some swelling of the cervical glands. After that she began to cough slightly, but without expectoration; has continued to cough winter and summer since, but during the last three months her cough has been accompanied by considerable expectoration of a glairy, mucous character. She has been very nervous, and slept poorly for some time past. Appetite has been growing poorer. Has been having chilly sensations and fever on and off irregularly. Menstruation regular. Last two weeks has had fever most of the time. Has had erratic pains through both sides of the chest, more or less, for the last six months, and some shortness of breath upon exertion, which is growing.

December 8.—Respiration 24, pulse 34, temperature 99°; incessant "tickling cough;" skin dry; tongue clean and reddish; bowels regular; fauces soft, doughy; sputum very offensive, containing tubercle bacilli.

Physical Signs.—She had creaking râles and bronchial respiration over the upper

left front and back; larynx rather pale and wet.

Treatment.—Salicine and malt mixture three times a day; Mosquera's food and milk three times a day; bromide of sodium at night (15 grains); spray of thymol twice a day in inhaling-room; oleum terebinth applied to chest every night; hypodermic injections of gold and sodium chloride ($\frac{1}{20}$ grain) every night, gradually increased to $\frac{1}{10}$ grain. On the 16th and 17th she complained of excessive pain in the chest, with sense of constriction; also some nausea and continual sweating day and night. The injection of gold and sodium chloride was reduced to $\frac{1}{80}$ grain, and so continued. Expectoration was never very great. It has now diminished to about one ounce in twenty-four hours. From this time to the 26th the cough was very much diminished. From the 22d to the 31st she went into the cabinet every day with two inches pressure taken off. She complained very much of the hypodermic injections. They seemed to produce neuralgia of the leg on that side. The evening temperature had been 99° up to the 28th, and on the evening of the 29th was 101°. During the night of the 28th and 29th she had four "loose passages" from the bowels. A hypodermic injection of 6 grains of bisulphate of quinine was given, and on the 30th the temperature was 98.5°, and on the evening of the 31st normal. The temperature continued so up to the time she left the hospital. The thymol spray was substituted on the 14th by chlorine inhalation once a day, which was continued until the 27th, but as it seemed to cause severe coughing afterwards, it was given every second day only.

When she left the hospital, February 20, she was still troubled with tickling cough and a feeling of tightness of chest, but had very little expectoration, in which no tubercle bacilli were found. She was stronger, ate well, and digestion was good, we saw her a week or two afterwards, when she seemed to be still improving. After this she went South to visit a relative, and we have not heard directly from her, but indirectly that she is quite well.

Case XIX.—N. L., aged 21; American; clerk; single; lives in a village; sanitary surroundings good.

Family history good; habits good. He was very well until two years ago, when he began suffering from hoarseness at night, with slight cough and expectoration. For the last year these symptoms have been growing worse. He never had hæmoptysis; never has been exposed, as far as known, to phthisical patients; has been growing weak generally during the last six months, and has had more or less soreness of the throat, with hoarseness.

September 14.—Looks thin and sallow; pulse 118, temperature 99.5°, respiration 22; considerable cough and expectoration in the morning. Sputum showed no tubercle bacilli. No pain in the chest, no dyspepsia, but "liable to diarrhœa;" no extra discharge from nasal passages; no stenosis. Conscious of fever, especially at night; nocturnal sweating two or three times a week. Laryngoscopic examination shows pharynx reddened, larynx hyperæmic and wet. Not much hoarseness; no odynphagia now.

Physical examination of the chest shows

diminished chest movement, percussion resonance good.

Auscultation.—Broncho-vesicular and bronchial respiration in patches over both sides; moist râles at the upper right front, with increased fremitus.

Treatment.—On account of the suspicion of specific infection, he was "put upon" inhalations of biniodide of mercury, 1 to 3000, and was given hypodermic injections of bichloride of mercury, $\frac{1}{20}$ grain, every other day, gradually increasing to $\frac{1}{12}$ grain. This continued until the 30th of September, when, the bowels becoming loose (seven passages daily), this treatment was discontinued, and he was given chlorine inhalations and tannate of quinine (3 grains) internally, every three hours, with 1 grain of pulv. opii at night, until the bowels were checked. He was given a teaspoonful of Mosquera's food and milk alternately every two hours, and insufflation of iodoform to the larynx. Temperature up to this time had ranged from 98° in the morning to 99.5° in the evening. On the 29th the temperature rose to 100.5°; pulse was 110 and feeble. Evacuation of bowels becoming more frequent, the temperature declined, and from the 3d to the 12th the evening temperature was normal, with the exception of the evening of the 8th, when it rose to 100°. This occurred after a hypodermic injection of $\frac{1}{5}$ grain of gold and sodium chloride. The further treatment consisted of the hypodermic injections of gold and sodium chloride, and tannate of quinine and bismuth internally, with inhalations of chlorine water and sodium chloride from face-shield inhaler. On October 2 the odynphagia

was increased; also the hyperæmia of the pharynx and upper larynx. Insufflations of iodoform with morphine were given every night up to the 9th, when this condition seemed to abate. The Mosquera food and milk was kept up during the time he was in the hospital, and when he left (October 18) he was very much improved in every way; strength good, etc., temperature had been normal most of the time for the last ten days; cough and expectoration was very much less, and no tubercle bacilli in the sputum. A week or so after leaving the hospital he went South, and seemed to do very well until December, when he contracted what was said to be a remittent fever. From this time on he became rapidly ill, losing flesh and strength; the cough returned, with considerable expectoration, also soreness of throat and loss of voice. He returned to Harper Hospital March 12, where he now is. Expectoration contains tubercle bacilli. His condition on entrance was quite grave; he was very much emaciated; temperature 101°, pulse 110, respiration very rapid (28), with considerable cough and expectoration, diarrhœa, and anorexia; very hoarse, and suffering odynphagia. Examination of the chest shows bronchial respiration and bronchophony in both upper fronts, with cavernous respiration and gurgling in the left infraclavicular region, demonstrating a softened spot probably the size of a turkey-egg. Examination of the left back shows also a softened spot, as evinced by much gurgling, mucous râles, and pectoriloquy. Laryngeal examination shows no ulceration of larynx, but swelling and hyperæmia. He is now receiving hypodermic injections of iodine,

⅓ grain, taking bone-meal and malt ale every four hours, with liberal soft diet, meat, eggs, etc. He also gets the chlorine inhalations three times daily. It is necessary to give him astringents and anodynes more or less to allay diarrhœa. This case is instructive in showing the danger of relapse when a plan of treatment is stopped too soon.

Case XX.—N. S. M., aged 22; American; housewife; married; no children; hygienic surroundings always good.

Family History. — Father died of acute phthisis, aged 40; otherwise family history good. She was never very strong or fleshy, but well until three years ago, since which time she has been ill more or less. Has had pain in the back, below the scapula, a great deal. Gradual loss of weight; weakness increasing; is not apt to take cold; has had more or less cough, for the past year and a half accompanied by expectoration of sputum, sometimes frothy, sometimes yellow and heavy. Says she had "la grippe" last winter, and has felt very much worse ever since. Had hæmoptysis last May, losing about four ounces of blood. Stomach has been irritable; suffered from indigestion, with vomiting, especially mornings and evenings. Appetite capricious; bowels irregular, constipated and loose alternately. Menstruation has continued, but of late has been growing scanty. Has not slept well for some months; apprehensive and nervous; has had night-sweats on an average two or three times a week for the last six or eight months. Has not been with anybody suffering from phthisis pulmonalis. Has never consumed much fresh meat or milk.

December 27.—Respiration 30, pulse 90, temperature (P.M.) 102°; skin moist, very white, and soft; tongue furred; bowels move twice a day; nausea now; very weak, unable to walk very far; trembling of the muscles, constant on exertion; erratic pains about the chest; tenderness of the abdomen; slight œdema of the feet.

Physical Signs.—Bronchial respiration, and pectoriloquy over upper right front; cavernous respiration; gurgling mucous râles over upper left front and back; broncho-vesicular respiration over right back; dulness on percussion; resonance of high pitch over the right upper right front and back.

Treatment.—Bone-meal, with malt ale, four times daily; chlorine inhalation (five minutes in inhaling-room) morning and evening; hypodermic injection of gold and sodium chloride, $\frac{1}{20}$ grain, every night; glass of hot water every morning early. On the evening of December 28 the temperature rose to 102.5°, falling to 97° the following morning. After an interval of three days, when the temperature ranged from 99° to 101°, it again rose to 103.2° in the evening, and kept up until about four o'clock in the morning, when a gradual subsidence took place until eight o'clock, when it was 98°. From this time up to January 28 there was a general lessening of "hectic fever," the main rise of temperature taking place at intervals of about three, four, and five days, and from February 1 the temperature gradually diminished until February 12, obtaining a range of 98° to 101.5°. Diarrhœa came on at intervals during the period of her stay in the hospital. The pulse gradually grew more fre-

quent, with some loss of tension. After January 22 until February 14, when she left, her pulse was from 90 to 110. Tenderness of the abdomen seemed to increase, and also œdema, during the last two weeks of her stay in the hospital. After the first three weeks of treatment the expectoration diminished, as also the cough, and there was an improvement in the appetite and digestion, but this soon gave way to exacerbations of fever, diarrhœa, and anorexia. On account of severe neuralgia excited by the hypodermic injections, they were discontinued on January 4 until the 10th, and after that given only every other day. The hypodermic medication with this patient consisted entirely of chloride of gold and sodium. During the first two weeks the injections not only excited neuralgic pains spoken of, but, when $\frac{1}{5}$ grain was given, produced vertigo, nausea, and feeling of constriction about the waist, which lasted from one to three hours. The patient left the hospital for her home February 14, and, according to report, died about March 1. No autopsy was held. Although gaining strength, and apparently improved during the first three weeks of her stay in the hospital, during the last two weeks she seemed to gradually fail. However, when she left she did not show much more weakness than when she entered. This was undoubtedly a case of advanced general tuberculosis. Besides the special treatment, there was, of course, instituted a various range of symptomatic treatment, consisting of the administration of acetanilide, bromides, codeine, pepsin, pancreatin, tannate of quinine, etc. The stimulants used were principally the malt ale of Parke, Davis

& Co., eggnog, milk-punch, etc. At no time were the tubercle bacilli absent from the sputum.

One noticeable feature in the treatment of this case was the tonic effect of the gold and sodium, which lasted sometimes for half a day.

Case XXI.—D. V., aged 11; American; female; domiciliary surroundings damp.

Family history bad. Has one sister suffering from tuberculosis now, and has lost one sister with this disease. She was never a strong child. When a few months old she had so-called congestion of the lungs; has been weak and more or less ill ever since. When six years of age, she had whooping-cough; since that time has coughed more or less. Appetite capricious; more or less fever and chills; persistent diarrhœa, two to four watery movements daily. Considerable cough and expectoration during the cold months of the year.

January 5.—Respiration 40, and panting; pulse 130, temperature 102°; very much emaciated and of waxy appearance; sputum copious, markedly offensive, and contains many tubercle bacilli.

Physical Signs.—Excavation in places over both lungs; gurgling râles, pectoriloquy, and cavernous respiration, marked throughout the left and upper part of the right lung.

Treatment.—Bone-meal, carbonate of iron, of each 3 grains, every four hours; milk-punch four times daily; beef-balls; unguentum iodidi comp. applied to chest every night; hypodermic injections of chloride of gold and sodium, and aromatic spirits of ammonium two or three times during the night.

This patient remained in the hospital from January 5 to January 24, progressively growing weaker; temperature never getting below 100° but twice,—on the 12th and 19th,—and then ran down to 97° in the morning; evening temperature ranged between 102.5° and 104°; respiration grew more rapid, dyspnœa great; no marked effect of treatment was noticed. Diarrhœa was kept under control by tannic acid, tincture of opium, and finally nitrate of silver and opium.

Case XXII.—Carrie V., sister of D. V., aged 20; American; single.

Family history bad. She was well until two years ago, when she began to grow pale and emaciated. Has had cough since last winter. Before that, for about six months, she was troubled with hawking and considerable hoarseness; subject to colds; never had hæmoptysis; has had dyspepsia and diarrhœa more or less during the last year, which during last summer was quite persistent; has had night-sweats frequently since last September; no menstruation for six months.

Physical Signs.—December 29, 1890, gurgling mucous râles and pectoriloquy over upper right back and front; bronchial respiration; bronchophony over upper left. Pale, waxy appearance; very much emaciated; very weak, unable to sit up more than half an hour or an hour at a time; bowels tender, tympanitic, and "loose;" evacuations watery; expectoration copious; cheesy, and teeming with bacilli; swelling of both feet and ankles; pulse small, thready, 112; respiration 30, temperature 102°; anorexia persistent; dull and sleepy.

Treatment.—Mosquera's food (1 drachm) every two hours; 2 drachms of whiskey, 10 minims of chloranodyne, with 5 grains of tannic acid every four hours; hypodermic injections of gold and sodium chloride ($\frac{1}{15}$ grain) morning and evening. The dose of the injection was gradually increased to $\frac{1}{10}$ grain twice a day and $\frac{1}{5}$ grain once daily. No reaction seemed to follow, excepting after the one of January 5 a sense of increased strength came to the patient, lasting three or four hours. This occurred after each injection for a while. There was also slight diminution of the œdema of the feet noticed. The injection seemed to have no effect on the temperature whatever; regular hectic fever, with temperature rising to 102.5° and 103.5° every evening, and 97° to 98° every morning, continued. During the time of the injection of $\frac{1}{5}$ grain of gold and sodium it was noticed that the nocturnal sweating increased. No change in the quantity of bacilli in the sputum took place. Patient left the hospital January 24 with her sister, since which time they have not been heard from.

Case XXIII.—S. S. P., aged 30; native of Michigan; residence on the shore of Lake Huron; habits good; occupation, lawyer, with very little out-door life.

Family History.—Father died of phthisis, and two brothers of pneumonia (?) or phthisis. One brother living, healthy, aged 36; maternal relatives healthy. He was never very fleshy, but tolerably well; had hæmoptysis twice last spring, not very much in amount each time; chills and fever more or less ever since. Began to cough last February; dated it to an attack of "la grippe," and has coughed since

and expectorated considerably, especially in the morning. Has suffered more or less with indigestion, but no diarrhœa; has had no nocturnal sweating.

August 11. — Present appearance spare; height, five feet seven inches; weight, one hundred and thirty pounds; pulse 100, temperature 99°, respiration 20; coughs considerably, but slight expectoration, white in color; pain in right side of chest on and off, not aggravated by movement; sleeps well; nasal passages not obstructed and only occasional extra discharge; has pain, odynphagia, and hoarseness lasting for two or three days at a time.

October 25.—Physical exploration of the chest shows slight dulness over upper right front, prolonged jerky expectoration, exaggerated vocal resonance; laryngoscopic examination shows the whole larynx hyperæmic with some extra mucus; no particular swelling of the arytenoids; sputum contains a few tubercle bacilli. He consulted me again, at the office, on October 25, and the cough had continued since I saw him. He thought he felt a little weaker; had not had night-perspiration much since last visit, and his appetite was tolerably good and his bowels regular, although he did not sleep as well; he had been troubled some at night by a cough; expectoration a little more than formerly; also some increased pain in the chest; breath shorter.

Physical signs at this date: Bronchial respiration and bronchophony very pronounced, with moist râles over upper right front; exaggerated murmur on the left side; expectoration contains tubercle bacilli. He entered

the hospital November 1, his condition as follows: Respiration 28, pulse 88, temperature 98°; this was about noon. At 8 P.M. this date, the respiration was 30, pulse 96, and the temperature 99.5°. He perspired easily upon exertion; appetite quite poor, with slight nausea; bowels regular; tongue somewhat coated. He complained of some slight soreness in swallowing; voice a little husky. Laryngoscopic examination showed the pharynx and fauces quite red, with abundant secretion in crypts of tonsils. Upper larynx also red; vocal cords brownish white; not much swelling.

Prescribed for him bismuth (fifteen grains) half an hour before meals; inhalation, in inhaling-room, of eucalyptol, 1 ounce, twice a day, with inhalation from face-shield inhaler of the spray of bichloride of mercury, 1 to 3000, once daily before eating; Mosquera's food in the afternoon, evening, and at bedtime. On November 3 inhalation of chlorine gas was prescribed, but, on account of the production of severe cough and irritation of throat, it was discontinued, and the bichloride of mercury and eucalyptol was resumed. On November 6 he received a hypodermic injection of iodine, $\frac{1}{12}$ grain. This was continued every night until the 11th, when it was increased to $\frac{1}{8}$ grain, and on the 14th to $\frac{1}{2}$ grain. Coryza, discharge of the nose, and slight diarrhœa with cutaneous eruption having appeared on the 15th, the dose was reduced to $\frac{1}{12}$ grain. Range of temperature up to the 12th of November was from 98° in the morning to 100.2° in the evening. November 7 to 19 it decreased by 98.5° in the morning to

99.5° in the evening, excepting on the 14th and 16th, when it went to 97° in the morning. On the 18th, the time of the last ½-grain hypodermic injection, the temperature rose to 100.5° and remained for about four hours, gradually decreasing, however, and not rising again, except on the 23d, when there was a slight rise again for an hour. From November 14 to 24 he was put in the cabinet twice a day for three minutes each time. The examination of sputum just before leaving the hospital showed no tubercle bacilli present; the respiration was very much improved, the general strength had returned, the appetite was good, the bowels quite regular, and he slept pretty well all night; the cough had pretty nearly ceased; expectoration amounted to no more than two drachms on that morning; the physical signs showed no râles, but slight coarse respiration of the upper right front. Soon after leaving the hospital he went to Arizona for the winter, where he has since been, and at last report from him (two weeks ago) he had been steadily gaining in weight and had little or no cough. He considered himself perfectly well.

Case XXIV.—Mrs. D. H., aged 36; American; housewife; widow; four children; domiciliary surroundings good; habits good; has always worked at housework.

Family history good. Husband died of consumption three months ago; attended him and did her housework besides. Was always well until about three months ago, when she began to have a dry, hacking cough, followed by pain in the left side of chest and severer coughing; and then began to expectorate yellowish, thick

sputum, which gradually grew whiter and thinner. Expectoration occasionally streaked with blood, but never had hæmoptysis. Appetite fair; bowels regular; menstruation regular; sleeps well, excepting for cough and slight sweating.

January 2.—Looks pale; not thin; slow of movement; slight swelling of the feet, especially in the evening; some dyspnœa on exertion; respiration 28, pulse 110, temperature 100.5°; expectoration not profuse, contains tubercle bacilli and pus. Examination of urine on the 3d revealed the presence of albumen, granular casts, pus corpuscles, and urates; reaction alkaline; specific gravity 1010. Voice all right; no odynphagia.

Physical Signs.—Slight dulness on percussion over upper left front and back; bronchial respiration, bronchophony, with mucous râles over upper left front down to the fourth rib and over apex behind; loss of vesicular quality and subscapular râles over right apex; vesicular quality weak.

Treatment.—Bone-meal and malt, with two drachms of whiskey, three times daily; Mosquera's food and milk between meals; hypodermic injection of iodine, $\frac{1}{12}$ grain, to be increased to $\frac{1}{6}$ grain gradually.

Temperature ranged from 98° in the morning to 100.5° to 101° up to the 11th, when the morning temperature was 97°, and at 2 P.M. it was 101.8°, and at 8 P.M., 102.2°. At this time she was receiving $\frac{1}{6}$ grain of iodine. Puffiness of the feet was still present, with no change in the urine excepting that it was less in quantity; expectoration diminished, and more "shortness of breath;" bowels "loose"

from the 11th to the 14th. The iodine was now substituted with chloride of gold and sodium, $\frac{1}{10}$ grain, and, instead of the bone-meal and malt formerly given, dilute (15 minims) nitro-muriatic acid was given in water before each meal. Nourishment continued the same. January 15, malt ale was given three times a day with 10 minims of tincture of capsicum, and the nitro-muriatic acid was discontinued on account of redness of tongue. Anorexia seemed to be complete. Evening temperature gradually ranged from 98.5° in the morning to 100.2° in the evening until February 5, when the evening temperature reached 102.8°. Inhalations of chlorine were kept up from January 10 to the time she left the hospital, nausea and vomiting following the use of chlorine twice only. She was able to take two and sometimes three inhalations of chlorine gas daily very well, without excessive coughing at any time following. On February 3 examination of sputum showed absence of tubercle bacilli and great diminution of expectoration and cough. The anorexia, however, remained, and there seemed to be no marked increase of strength, but a falling of body-weight. The physical signs showed absence of râles, brocho-vesicular and bronchial respiration remaining. Examination of urine still disclosed presence of albumen and casts, but these were fewer and broken; the œdema was lessened. She returned to her home in Chicago in February, since which time we have not heard from her, although we suppose her physician is keeping up the treatment. We found no tubercle bacilli in the urine.

Case XXV.—Mrs. E. L., aged 29; Ameri-

can; widow five years; husband died of pneumonia; hygienic surroundings good; has not taken good care of herself, having kept late hours, attended entertainments, etc.; been telegraph operator for four years, and worked hard.

Family History.—Mother lost three sisters of phthisis pulmonalis; father died of pneumonia, aged 56; nephew died of phthisis; one sister died of pneumonia. She was generally pretty well, though very nervous, until last winter, when she was seized with "la grippe," followed by pneumonia, from which she was ill in bed five weeks, after which she went to Chicago, where she improved until September, 1890, when, while travelling, she took a severe cold, and has since felt worse. She has been coughing since last winter, sometimes expectorating very little, at other times freely. Had hæmoptysis first last January, expectorating then three ounces of bright aerated blood. This has frequently occurred since (expectorating thin blood), but usually just preceding menstrual period. She had "chills and fever" on and off for the last few months, and also what she calls "fainting spells." Capricious appetite; does not digest food easily; vomits often; diarrhœa and constipation alternately. Never sleeps well; has nocturnal sweating more or less.

January 18.—Respiration 36, pulse 80, temperature 99°; very restless and nervous; skin moist; tongue coated; bowels regular; not much appetite; feeling of emptiness at epigastrium; erratic pains about chest and abdomen; feels very weak, unable to walk very far; after exertion perspires freely, and has dyspnœa; a few tubercle bacilli in sputum.

Physical Signs.—Dulness on percussion, and bronchial respiration over upper third of left lung, with moist crackling at apex.

Treatment consisted of compound tincture of gentian with bone-meal three times per day; glass of hot water every morning; hypodermic injection of gold and sodium ($\frac{1}{20}$ grain) at night; solution of bromide of potassium (10 grains), also at night; chlorine inhalation once daily (fifteen minutes in inhaling-room); inhalation of ether and chloroform at night, if necessary to allay cough. The first hypodermic injection was followed by slight nausea, and pain through both limbs and back. After this there seemed to be no further disturbance from the injections, the dose of which was gradually increased up to the 31st, when she received $\frac{1}{6}$ grain. This was followed by vertigo and dilatation of pupils. On February 1 the same symptoms followed a like injection, with considerable nervous irritability in addition. The dose was lessened to $\frac{1}{10}$ grain, which was given every night until the 7th of February. On account of copious perspiration, the hypodermic injection was omitted until the 10th, and from that time $\frac{1}{10}$ grain was given every other night.

The range of temperature varied from 98° to 100.5° up to the 1st of February. From that time it gradually decreased. On the 4th and 5th of February it remained at 98° nearly throughout the twenty-four hours, which was probably occasioned by a diarrhœa excited by eating some nuts. During the forty-eight hours just mentioned she had seventeen movements of the bowels. This condition was checked, and the temperature soon became normal, al-

though the bowels remained "loose" up to the 12th of February. On the 10th and 12th of February the evening temperature went up and remained for about an hour at 101°, and on February 13, after an injection of $\frac{1}{8}$ grain of gold and sodium, temperature went up to 104.2° for about an hour. Her bowels continued "loose" during the time that she remained in the hospital. Examination of sputum February 11 showed scarcely any bacilli. She had very little cough, excepting at night, and very little expectoration. She was obliged to leave the hospital on account of some domestic matters, and returned to her home, where her treatment was kept up for a while by her family physician. We have not heard from her since about the 2d of March. She was then doing well.

Physical exploration of the chest on February 26 showed absence of moist râles, but instead sibilant and creaking. Other signs the same.

Case XXVI.—Mrs. C. C., aged 30; native of Ohio; married; two children; hygienic surroundings tolerably good; habits good, although she has always worked hard.

Family history good. She has been complaining for eight years of "stomach disorder" of one sort or another; before that she was generally well. Has not had any uterine disease of any sort. Has been coughing more or less (especially mornings) for three years. Has taken considerable medicine. The sputum on two or three occasions was streaked with blood, but she never had any real hæmoptysis. Generally had pretty good appetite; bowels regular; has slept well. Menstruation for last year has been rather irregular.

January 28.—Respiration 28, pulse 100, temperature 99°; feels quite weak, looks pale; wants to lie down the greater part of the day; perspires easily; very little appetite; bowels constipated; some headache; pain in back part of chest. Has considerable cough and expectoration, which is thick and contains much offensive matter, and tubercle bacilli.

Laryngoscopic Examination.—Mucous membrane of larynx and pharynx somewhat pale. Physical exploration of the chest shows dulness on percussion, and sibilant râles over upper left front and back. Bronchial respiration and bronchophony, but no moist râles over the upper right front and axillary region. The right back shows diminution of respiratory murmur, with high-pitched, prolonged expiration.

Treatment.—Hypodermic injections of iodine, $\frac{1}{12}$ grain; inhalation of chlorine gas (1 drachm of chlorinated lime) three times a day; cone inhalation of spirits of chloroform and ether at night to allay cough; compound tincture of gentian, two teaspoonfuls three times a day before eating; glass of milk between meals at dinner and evening; phosphate of sodium, 20 grains, occasionally, in the morning in hot water, as a laxative.

The temperature on the evenings of the 8th, 9th, and 10th was only 99°, but from the 11th to the 15th the evening temperature rose to 101.2°; morning temperature 98.5°. There was also some increased salivation on the 14th; also eruption of the skin, with slight coryza, and diminution in quantity of urine and expectoration. The injections had reached $\frac{1}{8}$ grain. From the 15th the iodine was diminished to $\frac{1}{10}$ grain, and continued at that until

the 27th of January. During this time the temperature ranged from 98.5° in the morning to 99.8° and 100° in the evening. The expectoration, which was at first diminished, began increasing rapidly; there was a great deal of cough in the evening and during the night. The extra discharge from the nose continuing, on January 28 a spray of Dobell's solution was used through the nasal passages. On the 18th she complained of feeling somewhat weaker, which could not be accounted for, but the next day this sensation seemed to disappear. On January 27 $\frac{1}{8}$ grain of iodine, and on January 28 $\frac{1}{2}$ grain, was administered hypodermically. The symptoms of iodism came on again, but with less violence, and the injection was now changed to chloride of gold and sodium, $\frac{1}{10}$ grain. This was continued up to February 5, when $\frac{1}{5}$ grain was given; February 6, $\frac{1}{3}$ grain was given, which produced perspiration, some diarrhœa, a feeling of constriction about the body, and headache. These symptoms lasted about four hours. The dose was diminished to $\frac{1}{10}$ grain, and continued to February 12, when a hypodermic injection of $\frac{1}{8}$ grain of iodine was given instead of the gold. In the mean time the expectoration had greatly diminished. The temperature range continued from 98.5° in the morning to 99.5° in the evening, once in a while going up to 100°, until she left the hospital.

February 18.—The cough and expectoration greatly diminished, occurring only at night. Her strength was greatly increased. The color of lips and mucous membranes generally better. Laryngoscopic examination

showed the mucous membrane of the larynx and pharynx still a little pale. Appetite was better and bowels regular. The physical signs showed a very decided clearing up of the bronchial respiration, and bronchophony over the right lung. Sibilant râles and creaking were still present over the upper left, and also some creaking râles over the upper right. The examination of the sputum on the 17th of February showed still a few tubercle bacilli present. The treatment had been continued by her physician at home, who uses two or three hypodermic injections a week of the iodine and gold and sodium alternately, and the last report shows that the patient has continued to improve steadily since leaving the hospital.

Case XXVII.—P. T., aged 32; native of Michigan; married; has one healthy child; farmer; always worked very hard until becoming ill. Habits good; always smoked and chewed moderately.

Family history good. He says he was always well until attacked by "la grippe" last winter, since which time he has felt weaker, and has had more or less cough and hoarseness ever since. He is worse in the morning, at which time he expectorates considerable. Appetite has been fairly good; bowels regular; has slept well, excepting for cough. Never had hæmoptysis. During last winter he had chills and fever more or less all the time. He has been hoarse, he thinks, for nearly a year.

January 29.—Looks very well in the face, though pale; six feet in height; former weight, one hundred and sixty-five pounds; present weight not known. He has considerable cough

and expectoration in the morning; slight pain on swallowing; more or less hoarseness, which is worse in the afternoon and evening; pain in the left side of chest; no indigestion or diarrhœa; not much extra discharge from the nose; no nasal stenosis; has not "lost very much flesh" during the last year, but is conscious of being weaker. Respiration 26, pulse 80, temperature 100.2°.

Physical Signs.—Sputum teeming with bacilli. Laryngoscopic examination shows both arytenoids quite swollen and red; larynx very red, but no erosions noticeable. Percussion dull over both upper fronts and also left back; small cavity in the upper right apex as evinced by whispering pectoriloquy, cavernous respiration, and occasional thick râles; over the upper left front there are a few moist râles; bronchophony and bronchial respiration also at the left apex behind. There was broncho-vesicular respiration, with diminished fremitus, at the lower left back, and prolonged expiration; creaking and sibilant râles in the left scapular and left mammary region; increased percussion resonance over right back.

Treatment.—Hypodermic injection of iodine ($\frac{1}{5}$ grain) every day. Inhalation of chlorine gas (twenty minutes in inhaling-room) twice a day; bitartrate of potassium, $\frac{1}{2}$ drachm in a glass of water, every morning; beef-tea; milk three times a day between meals; bone-meal twice daily. From January 29 to February 2 the evening temperature rose from 100.5° to 101°, and the morning temperature from 98.5° to 99°. Voice became more husky, almost aphonic; increased soreness of the throat amounting to odynphagia. Laryn-

goscopic examination showed no increase of hyperæmia, but increase of secretion. Expectoration also increased and became a watery mucus. The dose of iodine was now reduced to $\frac{1}{12}$ grain. On the night of February 3 an insufflation of iodoform and morphine was given to allay soreness of throat. From this time on the temperature gradually decreased, the evening temperature never going above 100°, and the morning temperature being from 98.5° to 99°, excepting on the morning of February 9, when it went up to 100°. He complained of more soreness across the front of chest at this time. The voice gradually grew better, although remaining hoarse, and pain upon swallowing rapidly diminished. He took a hypodermic injection of $\frac{1}{6}$ grain of iodine from this time on to the 18th, when he left the hospital. From the 11th to the 18th the temperature remained normal, and the pulse between 84 and 90. Examination of sputum on February 16 disclosed only a few tubercle bacilli present. The expectoration had diminished to about half an ounce in the twenty-four hours. Urine was highly colored, but contained only an excess of phosphates and muriates.

Physical signs on the 9th showed diminution of consolidation over the chest, and instead of moist râles at the upper right chest there were sibilant râles; although there were moist râles still at the upper left front, they were much less marked, and were replaced largely by creaking and sibilant ones. The swelling of the arytenoids was very much less, no erosion, and hyperæmia very much diminished. He was obliged to leave the hospital on February

18 on account of some matters pertaining to his farm, and returned to the hospital again in March, having been very well until three or four days before his return, when, by getting his feet wet, he took a severe cold, which increased the hoarseness and brought about a return of the odynphagia, with some increase of cough and expectoration. He, however, looked very well, felt strong, had a good appetite, and coughed but little. He expectorated about an ounce in twenty-four hours. The sputum on entering the hospital again showed a very few bacilli, but at this time (March 23) they have entirely disappeared from his sputum. His temperature varies only about half a degree between morning and evening. His voice is still hoarse, and there is some thickening of the laryngeal mucous membrane yet. He is still under treatment in Harper Hospital, and receives an injection of iodine, $\frac{1}{3}$ grain, and gold and sodium chloride, $\frac{1}{10}$ grain, on alternate days. He gets one inhalation daily, through the face-shield inhaler, of chlorine water and solution of chloride of sodium.